AMERICAN JOURNAL OF OPTOMETRY

Vol. 4 JULY, 1927 No. 7

CONTENTS

Original Papers

The Ophthalmometer in Glaucoma. E. LeRoy Ryer and E. E. Hotaling 198
Myoculator Treatments. L. L. DeMars..... 201
Hygiene and the Test Room. E. H. Walker..... 203
Theories of Possible Causes of Cataract and Glaucoma. W. H. Glazer 208

Abstract Department

Significance of Latent Ocular Muscle Imbalance. W. H. Fink..... 211
Refraction Under Cyclodamia. D. Smith..... 211
The Acid Test for Gold..... 213
The Placido Disc. L. A. Swan..... 213
Headaches of Ocular Origin. W. G. Gillett..... 213

Book Notices

The "Why" of Blue Lenses in Cataract Cases. W. Bagwell..... 214

Editorials

"Perfect Sight Without Glasses"..... 215
In Memoriam. John C. Eberhardt, Opt. D..... 216

Reports and Announcements of Societies

The Minnesota Board..... 217
The Mid-Summer Short Course at Minnesota..... 217
A. O. A. Meets in Washington..... 218

HINGE 694 HIRE
HINGE:—That on which anything turns or depends; a governing principle; a cardinal point or rule.
—Webster's International Dictionary

"that on which anything turns or depends—a governing principal—a cardinal point or rule."

THE cardinal point of Shur-on Twintex frames and mountings is the hinge. It is the patented, exclusive, wobble-proof hinge that makes Twintex the one practical spectacle improvement of a decade.

And to the Twintex hinge you may safely entrust the ultimate satisfaction of every pair of glasses you fit. For Twintex once fitted stays fitted. The famous double-grip, double-brace endpiece construction is permanently rigid and tight—practically break-proof and trouble-proof.

With Twintex there are no further time-eating, profitless adjustments, no more dissatisfied wearers, no more drooping frames.

Of course the success of Twintex has inspired many imitators—but there can be only one Twintex—that which is made by Shur-on. Imitations are not duplications and you can always identify the genuine Twintex by looking for the Shur-on trade mark stamped around the screw hole in the butt of every Twintex temple.

And furthermore, you can use Twintex in every case, for Twintex is made in a *complete line* of frames and mountings. You can have the good Twintex joint on any job from rimless to heavy weight lined frames; in the lightest of lined or unlined frames, in metal frames and mountings, too.

A good cardinal point or rule for you:

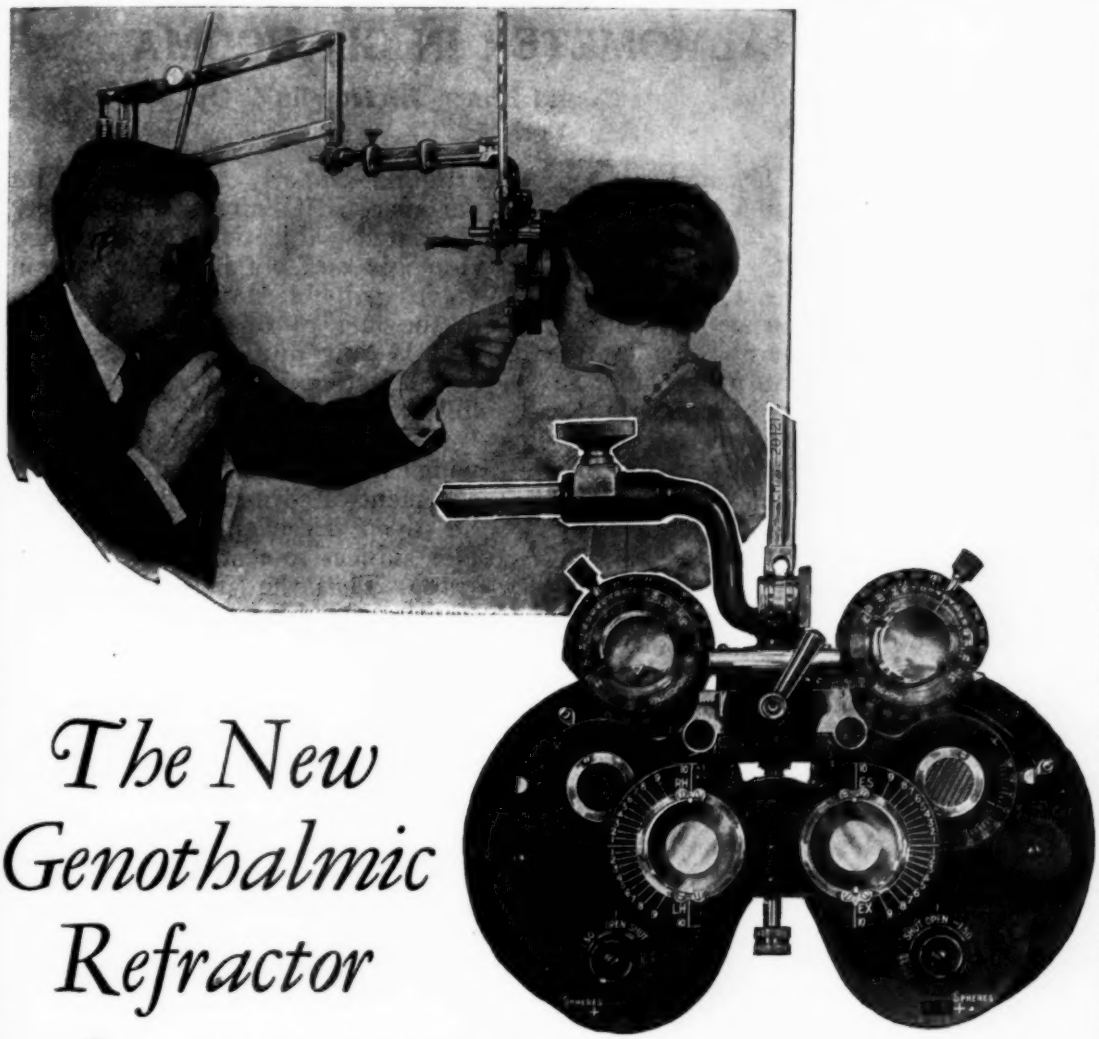
Use Twintex

SHUR-ON STANDARD OPTICAL COMPANY, INC.

GENEVA, N. Y., U. S. A.

NEW YORK, 100 E. 42ND STREET
CHICAGO, 5 SOUTH WABASH AVENUE
PHILADELPHIA, 1211 CHESTNUT STREET
SAN FRANCISCO, 278 POST STREET
BOSTON, 333 WASHINGTON STREET

Factories at GENEVA, N. Y., MOUNT VERNON, N. Y., ROCHESTER, N. Y., SOUTHBRIDGE, MASS.



The New Genothalmic Refractor

SUBJECTIVE eye tests can be made more easily, more quickly, and more accurately today than ever before. The reason is—the new Genothalmic Refractor, the most modern in all respects and the most efficient device known for applying either static or dynamic retinoscopy.

Any examination that is possible with the Trial Case can be easily handled with the Genothalmic Refractor. In addition, the Refractor makes possible many tests that must be omitted when only a Trial Case is available.

Send for new 28 page illustrated booklet.

SHUR-ON STANDARD OPTICAL COMPANY, INC.

GENEVA, NEW YORK, U. S. A.

NEW YORK, 100 EAST 42ND STREET
CHICAGO, 5 SOUTH WABASH AVE.
PHILADELPHIA, 1211 CHESTNUT STREET
SAN FRANCISCO, 278 POST STREET
BOSTON, 333 WASHINGTON STREET

Factories at GENEVA, N. Y., MOUNT VERNON, N. Y., ROCHESTER, N. Y., SOUTHBRIDGE, MASS.

AMERICAN JOURNAL OF OPTOMETRY

Vol. 4 JULY, 1927 No. 7

OPHTHALMOMETER IN GLAUCOMA

E. LeRoy Ryer, Opt. D. and Elmer E. Hotaling, Opt. D.
New York, N. Y.

Assuming the following premises tenable we have been forced by their logic to modify our practice in a very important detail.

As it affects us so it affects every other optometrist hence we submit the problem for general consideration believing the present universally accepted basis from which lenses are prescribed for the correction of refractive errors ill-founded in one major respect but capable of being placed upon a safer basis if only the need for rectification be recognized.

Whether or not our suggested remedy be the best is of course open to question but a fair evaluation of all the factors involved seems to leave no question as to the need for some change in method to insure the maximum prophylaxis from optometric treatment. We, therefore, deem it of primary importance to establish the weakness of the present method as the initial step toward ascertaining the final remedy and we hope the dual purpose of this paper will be kept in mind.

The disturbing premises to which we allude are:

(1) That uncorrected or miscorrected faulty refraction may precipitate glaucoma in predisposed eyes.

(2) That the correction manifested under the usual subjective test is not necessarily the true correction.

(3) That if faulty correction may precipitate glaucoma in predisposed cases the use of a cycloplegic with inevitably accompanying mydriasis is fraught with far greater danger.

(4) That a low grade corneal astigmia is probably the most prolific source of trouble.

(5) That a low grade corneal astigmia may be neutralized by ciliary stress and resist detection by the usual subjective test be it noncycloplegic, cycloplegic, or postcycloplegic.

(6) That if a low grade corneal astigmia properly assumes this importance, if it can not be correctly estimated subjectively without cycloplegia and yet if cycloplegia involves palpable danger or if risked in the face of this inherent danger affords only questionable assurance of subjective accuracy, it seems to follow

(7) That the ophthalmometer which affords the one definite measurement of corneal astigmia should be given precedence of the indefinite subjective test.

(8) That the cylindrical correction indicated by the ophthalmometer should be applied, with proper allowance for lens position, as the initial step in the diagnosis and correction of all ametropic and heterophoric conditions or, on a still more conservative basis,

(9) That the mathematical ophthalmometric readings be given at least as serious consideration in our analysis as the uncontrollable psychologic subjective findings.

If these premises are not totally untenable they establish a demand for more detailed consideration in the hope of finding a method that will insure accuracy in the diagnosis and correction of this particular form of refractive error.

Who that ever watched a case of glaucoma from incipiency to enucleation or ever saw a glaucomatous eye in the advanced stage will not willingly admit that glaucoma is one of the ocular conditions most to be dreaded?

The optometrist, the medical refractionist, and the general medical practitioner, not to mention the osteopath, the chiropractor, and the throw-away-your-glasses advocate, each in his own sphere, has in every case of refraction he touches a heavy responsibility insofar as at any moment a case predisposed to glaucoma may present itself which will be saved only by accurate diagnosis and treatment adequate to the exigencies of such a case.

While sure diagnosis and timely therapeutic or surgical measures often save the eye afflicted with glaucoma, false diagnosis or delayed or inadequate treatment often causes total loss. Obviously the establishment of glaucoma means nothing less than a menace of blindness.

It is frankly admitted in ophthalmologic circles that glaucoma causes one-quarter to one-third of the blindness after the age of forty; that glaucoma is the one important cause of loss of vision in which no concerted effort at conservation has been made; that the public has not been educated to the significance and danger of glaucoma; that while the general medical profession is alive to the seriousness of loss of vision it is not sufficiently conversant with the fatality of glaucoma and its prevalence; and that too often it is the ophthalmologist himself who is at fault. (Derby, Am. Jour. Ophthal. March, 1927.)

This is the gloomy picture presented by the development of glaucoma, all of which goes to strengthen our contention that if prophylaxis is anywhere valuable it is preeminently valuable in glaucomatously disposed eyes.

So leaving the treatment of glaucoma, once it gets a foothold, to the ophthalmologist, where it unquestionably belongs, let us as optometrists accept the responsibility that devolves upon us to do everything possible to prevent a tendency developing into an actuality.

What can we do?

We can learn to look upon every case of faulty refraction as one of potential danger and overhaul some of our outworn methods of estimating them. We can learn to cease thinking that optometry embodies nothing more than getting a subjectively acceptable pair of glasses on the patient. After which we can learn that something more is needed than a perfunctory subjective test if we are to give those cases predisposed to glaucoma the preventative or prophylactic insurance which lies back of a true diagnosis and correction of any ametropia and especially of a corneal astigmia.

There is sufficient evidence, if one will but heed it, to shake our smug faith in the belief that the common subjective test uncovers the true state of refraction; there is some evidence that a faulty refractive correction may be a source of danger to eyes predisposed to glaucoma; there is more than ample evidence that a cycloplegic is a most potent source of danger in eyes predisposed to glaucoma; and there is some evidence that a cycloplegic does not insure an absolute subjective correction.

Is it fair to let the matter rest where it stands today?

We thought not and attempted a practical improvement by experimenting empirically with cases of low grade corneal astigmia. Here we found that some eyes are able of themselves to neutralize such errors and that such errors develop persistent latency which will not give way at once under the usual subjective tests. We have ample proof in cases cited in previous papers that long continued crystalline compensation of corneal astigmia is accompanied by cataract which seems linked significantly with it and from that we work on the hypothesis that as such a condition is so probable a cause of cataract it may be the cause of glaucoma in predisposed eyes.

From unbiased observations we feel justified in alleging that far too many of us fail to adduce from the ophthalmometer many extremely valuable data that judicious application elicits.

The ophthalmometer gives the one definite measurement, that one measurement free from vagaries of the accommodation, obtainable in optometry and we raise the pertinent question—upon what ground do those who question definitely precise ophthalmometric readings accept with such complacency indefinite subjective findings?

The question may be put still more fairly and more concretely—why is it not at least as good practice to give an eye a chance to accept the ophthalmometric corneal astigmia correction as to take far more chance on blindly prescribing the cylindrical from the subjective findings?

Others, as well as ourselves, have found that a properly computed cylindrical correction based strictly upon the ophthalmometer that may not be acceptable at once subjectively is frequently accepted if given time and ac-

cepted in less time if accompanied by base-in kratometric exercises.

Again, in dynamic retinoscopy our first step is to place in the optometer the cylindrical indicated by the ophthalmometer and to build the spherical correction upon that. Time and time again we find the ophthalmometric cylindrical readily acceptable if applied first and not thrown out by the previous application of the incorrect spherical.

If too low a plus spherical, for example, is first placed before an eye being tested subjectively naturally a higher plus cylindrical will give apparently good visual acuity and if too high a plus spherical be used first a lower plus cylindrical will be called for to obtain the same visual acuity. But is it not self-evident that we thus allow the spherical to vitiate the cylindrical finding and equally evident that if the correct cylindrical could be placed first the correct spherical would be found automatically?

Or, granting that the correct spherical were not manifested at once, is it not far more important that we obtain the correct cylindrical if possible and thereby eliminate the dangerous sectional accommodative stress? And we believe the cylindrical indicated by the ophthalmometer affords a concrete, well-founded start and with the astigmia thus eliminated there is surely a better chance of finding the correct spherical whereas with the astigmia left uncorrected until the last the spherical ascertained is almost sure to be wrong. In a word, with the astigmia uncorrected any spherical may be accepted whose power lies anywhere between the two principal meridians but with the astigmia corrected a definite spherical is called for.

We all know that any sphero-cylindrical correction might be worked out in three ways between which few patients could make a choice so far as visual acuity expressed subjectively is concerned. For instance, each of the following combinations will give essentially the same subjective effect:

$+1.25 = +0.75$ axis 90
$+1.00 = +1.00$ axis 90
$+0.75 = +1.25$ axis 90

and we accept this fact complacently. But transpose + on + prescription values to their usual + on — trial frame or optometer form and we have

$+2.00 = -0.75$ axis 180
$+2.00 = -1.00$ axis 180
$+2.00 = -1.25$ axis 180

Consider this carefully. What does it signify?

It let us see a light and gave us courage to face the plain truth that it is foolish to flounder about with low plus sphericals for the meridian of least error first and get one of three plus cylinders, according to the sphere picked under blurred vision, for the meridian of greatest error, and just as foolish to flounder about with high plus sphericals first for the meridian of greatest error and work literally and metaphorically in the fog with minus cylindricals for the meridian of least error.

It signified, to us, that we were on far safer ground in starting with the minus cylindrical as indicated by the ophthalmometer under the Javal rule in which case, as our example shows, whether that cylindrical be a —0.75, —1.00 or —1.25 the spherical element would come out correctly.

If we work subjectively entirely we are cornered because we have to start with a spherical and are virtually trying to adapt that spherical to a compound sphero-cylindrical condition, an obvious futility if we will not insist on keeping our minds closed.

We must stress the need, which will seem trite to many, of keeping always in mind that the corneal astigmia is on the posterior surface of the cornea and is exactly calculated at that surface by the ophthalmometer but that the correcting lens must of necessity be set about 15 mm. away in order to clear the lashes. Obviously the lens to prescribe is that which at 15 mm. distance is exactly equivalent to that indicated by the ophthalmometer at the cornea, allowing still further of course for the physiologic lenticular astigmia. If the latter could be worn in contact with the cornea no compensation would be called for. This is no defect in the ophthalmometer but the result of the fixed conditions which demand that the measurement be taken on the cornea and the correction worn an appreciable distance from the cornea. Thus far we have found no more satisfactory rule than that of Javal.

We have found that considerable

difficulty is experienced in getting many, though not all, older cases to accept the ophthalmometer cylindrical and that nearly all younger cases accept it far more readily. This signifies that we are on sound ground and that there is no excuse for not applying this principle in young cases and especially young cases being given glasses for the first time.

So view the matter as we will we conclude that to attempt to ascertain the spherical part of the correction first is illogical, unscientific and confusing while to use the cylindrical first as indicated objectively by the ophthalmometer has all the odds in its favor as we have shown.

But let us consider the matter very seriously and free from prejudice because aside from its value in routine cases it is very probable that the ophthalmometer reading if used judiciously, will afford on the whole a truer astigmic correction and if this be so it may be the means of relieving ciliary stress that may be carried uncomplainingly for years but which sooner or later may precipitate glaucoma in eyes predisposed to this morbid change.

MYOCULATOR TREATMENTS

L. L. DeMars, Opt. D., F. A. A. O.
Minneapolis, Minn.

The Myoculator is a new instrument. Like any new instrument, its manipulation must be mastered with ease and confidence. Coincident with such attainment comes greater and greater intelligence in its applications, therefore not much may be said about it until by study, practice, and conference it is more universally learned and thoroughly understood.

Described in simple terms, it is a mechanical device for projecting a moving target or targets into the spacial visual field. The purpose of these moving targets being, to excite impulses in subnormal retinal areas and arousing sensation in the corresponding latent visual centers, also, to compel extreme muscle action in the various extrinsics.

As I view it, it is a device to carry on, in some respects, an old work, namely: Muscle exercise and development, and in addition gives us a more practical and easier way to overcome amblyopia. Looked at in another way, it is an instrument for conducting muscular calisthenics in a dignified professional manner.

The idea of using muscular calisthenics in optometrical practice, is not new. There have been those who have advocated it, and attempted to devise the means to carry it on but little of real practical worth has been devolved. In the Myoculator with the various improvements which will be made in it from time to time, we will have a most valuable device and no doubt muscular calesthenics will become more and more understood and used in the years to come, and I believe it will revolutionize our systems of extrinsic muscle work.

Suppose you are looking at a point on the medium line at infinity. While doing so, if some object way to one side, the image of which falls on the extreme peripheral area should be caused to move, this object, of which you were formerly unconscious, will immediately command your attention. The reason is because the stimulation caused by the moving object over different nerve endings aroused sensation and stimulated muscle action.

Apply this now to any area of the retina of a normal eye the visual acuity of which may be lacking in sharpness or be deficient. The moving illuminated target bright by way of contrast with the surface on which it moves arouses physiological actions, which have been dormant. Now, wherever action is going on in the living body, it follows, that, nervous energy and additional blood supply are called to that part to cause the movement and rebuild the wasted tissue. Also, if it is attracted there once it is easier to be attracted there the second, third and fourth time and so on until that part is changed from weakness to strength. In this way the Myoculator treatments are used in treating amblyopic eyes.

This is also true with muscular calisthenics. Action attracts the nervous energy and builds the muscle tissues and the increased energy stimulates the nerve centers, adding to the ability of the muscles to endure. The intrinsic eye muscles, to be sure, do a lot of work in carrying on with the daily routine but this is only within certain limits determined by the nature of one's daily task, and their use is usually more or less limited. Muscular calisthenics carry on with an artificial briskness and rigor which is the real benefit of the exercise.

Oculo-prism treatments as we have used them, more or less focalizes the treatment to but a single set of muscles, and then in a rather cramped style, both by the pull or the shock system. Myoculator treatments as I have stated, stimulates all of the muscles in what I believe to be a more normal way.

It is a question as yet, if, with a patient having a very weak adduction and showing an exophoria at both far and near, if he or she can be made to overcome the phoria by means of the Myoculator treatments. It would seem, however, according to the theory that, after several weeks of vigorous treatment on the horizontal plane, that the eyes should show a normal balance when tested and at the same time show a plentiful reserve.

Especially should the Myoculator treatments be beneficial in those cases in which abduction has proved so immune to oculo-prism treatment. I say this because, as in the preceding paragraph, the Myoculator treatments should distribute so much new stimulous to all the extrinsics and their respective nerve centers, that muscular insufficiencies would automatically afterward readjust themselves into normal relations.

In some paper on a later date when the results obtained are better known, we will be able to discuss the details in cases of monocular development and reestablished fusion control.

HYGIENE AND THE TEST ROOM.

E. H. Walker, M. B., Ch. B., D. P. H.

being

A Lecture delivered to the Northern Committee of the British Optical Association, at the College of Technology, Manchester,

from

The British Journal of Physiological Optics.

It is to be recognised that the hope of public health work in the future lies in the education of the public in the ways of healthy living.

Improved sanitation has practically eliminated many diseases, such as plague, cholera and typhoid, whilst others which formerly decimated whole populations have lost their terrors now that we possess effective weapons for their control or cure.

In opening up this question of hygiene from the special standpoint of its interest to opticians I would premise that a sound mind is essential to a healthy body, and the cult of hygiene is never helped by cranks and fads. It might be said that even microbes are never as vindictive as they might be, and it is as well to always preserve a due sense of proportion.

Hygiene is defined as the study of the laws of health, not only in the avoidance of disease; we must also seek to be so aggressively fit as to be able to carry out our daily duties with real efficiency and with a reserve of energy to maintain a cheerful outlook and to enjoy our leisure.

The optician's test room, therefore, must never prove a source of infection, but must also enable the optician to carry on his daily work without unnecessary fatigue or without anything which will cause depression or interference with the quality of his work. The optician's occupation is mainly sedentary, and he or she is for a considerable portion of most days of the year under the influence of the environment of his test room, and it is necessary that this environment should be as healthy and congenial as possible. The ventilation and heating of the test room, as well as the optician's personal habits and clothing, should all be regulated by sound principles which conform to the laws of hygiene.

Since also the optician comes into fairly intimate contact with members of the community, it is very desirable that he should have a simple knowledge of how he may avoid contagion, and even how he may himself escape proving an offence. He should also remember that all obvious precautions in the interests of hygiene will be properly appreciated by an intelligent clientele.

Dealing firstly with the subject of ventilation, which is of paramount importance in the test room, it is as well to state that our knowledge of all the factors concerned in effective ventilation have been entirely revolutionised by the very recent work of Professor Leonard Hill.

It is definitely established that amongst the commonest effects of breathing a vitiated atmosphere are headaches, drowsiness, lassitude, disinclination for work, lack of concentrative power, dizziness and faintness. Further, repeated exposure to "stuffy" conditions lowers one's power of resistance to disease, and lays the foundation for tuberculosis, bronchitis, pneumonia, laryngitis, the common cold, adenoids and tonsil affections. What, then, are the special conditions obtaining in an ill-ventilated room which are responsible for the harmful effects on health of persons exposed to stuffy atmospheres? It has long been taught that the unpleasant sensations of smell and "stuffiness" are due to some subtle organic poison from the skin and lungs of the occupants, and it was perhaps natural that some chemical explanation was sought, based on comparison of analysis of inspired and expired air.

We fill our lungs about fifteen times every minute, and it is as important that the air we breathe should be fresh, as it is that the food we eat should be wholesome. Chemical analysis has shown that the oxygen content of expired air is less and the carbon dioxide is increased. What more natural than that this should be seized upon to explain the ill effects of breathing air vitiated by respiration—insufficient oxygen, excess of carbon dioxide, and organic poisons? True, it was noted that expired air contains more water vapour and is warmer than inspired air, but these were not considered highly important factors. How far this was a misjudgment we shall see later. It was computed that 3,000 cubic feet of fresh air would be required for each person every hour, and the problem set to gladden the heart and fill the pockets of the ventilating engineer was to effect that introduction of so much fresh air and the removal of so much effete air the requisite number of times every hour. Much ingenuity and material wealth has been expended in the attempt to solve the problem, and with indifferent success. From the time of Sir Christopher Wren attempts have been made to improve the ventilation of the House of Commons, and yet within recent years Professor Leonard Hill has demonstrated that the system there so operates as to produce "cold feet and stuffy heads."

Professor Hill constructed a wooden chamber 3 metres cubic capacity at the London Hospital Medical School with large glass observation windows and fitted with electric heaters, cold water coils and electric fans, and with this conducted an exhaustive series of experiments, which proved that the variation in the percentage of CO_2 in the atmosphere was of minor importance, and the relief to the conditions produced was to be found in cooling and not in altering the chemical conditions of the atmosphere. This fact had been previously noted in the cases of submarine crews submerged for periods up to 15 hours, during which time no fresh air was supplied or foul air removed. In such cases, although the interior of the boat was "somewhat close," there were no observable bad effects whatever on the crew although the total air space for six men was less than 2,250 cubic feet. It was found on analysis that these men had been breathing air containing up to 3½ per cent of CO_2, but the temperature of the surrounding water during immersion had kept both the temperature and the vapour pressure inside the submarine constant, the surplus water vapour being easily condensed on the walls of the vessel.

It is fair to deduce, therefore, that the problem of ventilation in ordinary rooms such as testing rooms is one of attaining the right cooling power, and not chemical purity of the air.

To sum up Professor Hill's researches, we are taught clearly that the factors producing discomfort and ill effects to the occupants of a stuffy room are:

(1) Not loss of oxygen. Students in sealed chamber until oxygen diminished so far as to extinguish lighted match caused only profuse sweating and discomfort, which was completely relieved by setting the air in motion.

(2) Not CO_2. Increased carbon dioxide in the air only stimulates deeper breathing to keep CO_2 in air in alveoli of lungs to normal 5 per cent limit.

(3) Not organic poisons. There are effete matters from skin and offensive organic odours from dirty clothing, but there is no evidence that these are poisonous.

What does matter is the state of the air as regards infection (bacterial contamination), motion, rate of cooling and evaporation, contamination with dust, e. g., coal dust (largely from the domestic fires).

Methods of Ventilation and Heating.

Proper ventilation must prevent stagnation of body heat on the one hand, and the uncomfortable chilling of the body on the other. Ventilation must be perceptible in order to stimulate the worker.

Conditions are comfortable when the temperature is low, so long as there are no cold draughts, and uncomfortable when the temperature is high, independent of the chemical purity of the air. Travelling in railway carriages with open windows is not uncomfortable until the feet become chilled.

No system of mechanical ventilation has succeeded in making indoor air healthful. Air currents and perceptible variations of temperature are essential to good ventilation. The "imperceptible ventilation" of the expert is a delusion and a verbal contradiction (Latin: ventus, wind).

The greater number of air changes, the less the infection by saliva sprayed out by persons with catarrhal disease in coughing, sneezing, speaking.

The radiant heat of an open fire and the ventilation maintained by it, supplemented by the open window whenever possible, is the most beneficial in this climate. The radiant energy of the fire makes up to some small extent for the lack of sunlight.

The coal fire is a good ventilator, venting 18,000 to 20,000 cubic feet of air per hour. It is variable, not monotonous. The attention required to keep a "cheerful" fire compels some little exercise and change of position, which is of value to a sedentary person. For a given output of heat, the first cost of coal is only about 40 per cent of gas. Coal subjected to low temperature carbonization burns cleanly and without smoke, and its universal use will do much to reduce atmospheric pollution.

The gas fire is not so good a ventilator as the open fire, and lacks the cheerful, variable blaze of the coal fire. Modern gas fires properly fixed and flued do not allow escape of fumes into the room. A plate glass cooled in ice water, held edgewise against the canopy will show a deposit of dew if there is any escape of flue gases. Gas fires can not be exonerated from the charge of contributing to the pollution of the outside atmosphere. Risk of carbon monoxide poisoning from the leakage of coal gas should also be remembered.

For rooms occupied each day, a coal fire is cheaper; for short periods a gas fire is more economical. Electric radiators are clean and effective, but expensive.

The mere observation of the temperature of the air in a room by an ordinary thermometer is no index to comfort.

It is common knowledge that one may remain in a room and not be aware of the increasing rise of temperature. In the case of schools, if control is left to the teacher, listlessness, inattention and ill health result in the pupils.

The regulation of ventilators is nobody's business, and many of them become simply dirt collectors.

The oxygen content of a given volume of air is decreased when the temperature of the air is increased. Obviously, then, breathing warm air reduces oxygenation of the blood, and produces anaemia and lowered vitality.

Central heating installations are devised to ensure that most of the thermal energy (50 to 70 per cent) of the fuel is actually used to warm the rooms. To conserve heat it is recommended that double windows, weathering strips and draught excluders be fitted, and windows not opened. Thus central heating aims at heated air and a minimum of ventilation, to favour economy of fuel, not the promotion of vigorous health. Central heating gives a monotonous, over-warm, still atmosphere, which is inimical to robust health, especially in those whose opportunities or appreciation of active outdoor exercise are limited.

Dust.

Dust finds its way everywhere. An apparently clean atmosphere may be shown to contain myriads of particles of dust when a beam of light is observed passing through a keyhole or narrow slit. After a brief period of unoccupation the dust of a room settles on the surface of furniture. Familiarity begets indifference, but when we consider the nature of the dust from the streets—soot and flue dust, granite from street pavements, garbage and decaying leaves, horse manure, dung of dogs, remains of insects and their eggs, moulds and micro-organisms—the importance of avoiding a dusty atmosphere is more obvious.

A layer of visible dust on furniture or test case is a challenge usually responded to by a vigorous "dusting" with a dry cloth, not infrequently followed by shaking the dust from "duster" into the room. Dry dusting and dry sweeping fill the air of the

room with dust, which, taken up with a damp duster or vacuum cleaner would not pollute the air.

Bacterial culture plates exposed in the staircase of a house before sweeping produced 750 colonies per cubic metre, and after ten minutes' carpet brushing 410,000. (Each colony indicates contamination of the plate by a single organism.)

In a stone staircase there were 140,000 after dry sweeping, and only 26,000 when the sweeping was preceded by sprinkling with water.

Dust contributes substantially to chronic nasal infection, especially in mouth breathers. Dusty roads are probably partly responsible for some cases of conjunctivitis. Motor transport, whilst slinging mud and filth about, has at any rate reduced to some extent the amount of horse manure on the roads.

A rubber mat, wiped with a lightly oiled cloth, will prevent the treading in of dust to a far greater extent than will a fibre mat. Floors are better oiled and polished, as they can then be properly cleaned with an oiled mop. Washing with water leaves much dirt behind, the cloth and brush quickly making the washing water filthy. Insufficiently drying the surface after flooding with water makes the room damp and cold, and damages metal fittings.

Dust should be considered in the same way as smoke and flies; all three can be greatly reduced when it becomes everybody's business to reduce them.

Nasal Catarrh, the Common Cold.

Epidemics of colds are common when the atmosphere is damp and cold, especially when the temperature varies rapidly; when the wind is cold and wet and the ground is wet and cold. Cold dry weather and strong drying winds do not favour these epidemics.

Men living open-air lives are free from "colds" whatever exposure to extremes of weather they undergo. For example, sailors on long voyages, Arctic travellers, lighthouse keepers. Shackleton, in his Antarctic expedition, recorded a single outbreak of "cold" after the opening of a bale of clothes packed in London. Men taken from shops and offices turned into soldiers, and put under canvas, escaped the "colds" from which they suffered in civil life.

Children during holidays may paddle all day in the sea, barelegged, exposed to far greater cooling than at school, until they shiver and are blue with cold; but they do not suffer from "colds" then. The "colds" begin when the weather confines them in shut-up and artificially-warmed schoolrooms. Infected saliva spray, sneezed, coughed or spoken out, may be passed on from a "carrier" to another victim. A zone within one metre of a consumptive patient has been shown to be particularly dangerous for guinea pigs kept within cages and exposed to saliva spray infection, particularly when doors and windows are shut in winter. Out-of-doors folk do not crowd so closely, and the ventilation is very much greater; even on the calmest day the air is not still, and convection currents are at work; the saliva spray is blown away, and the infection can not be massive, as it may be indoors or in closed railway carriages.

But infection is not the whole story. Certain weather conditions favour catarrhal complaints. Those who live an outdoor life and even city workers who take vigorous outdoor exercise are relatively immune to "colds." What is the nature of the hardening process set up by exposure to weather and cold baths? Exposure, even to extremes of cold, by itself does not produce colds or pneumonia. Shipwrecked folk exposed to the severest chilling do not suffer from nasal catarrh or pneumonia, and troops exposed to the severest hardship in the trenches suffered only when contagion spread such infections as influenza. The common cold may be caused not only by bacterial infection, but by dust—for example, cycling in the dust of motor-cars, by the pollen of certain grasses, or by a chemical irritant, such as sulphurous acid from furnaces.

"Colds" in the head are generally attributed to chill because they are ushered in by a chilly feeling—a shivering attack—many hours after the infection that caused them. People with "colds" coming on are suffering from absorption of bacterial toxin or of damaged tissue products, causing slight derangement of the heat-regulating mechanism.

Nasal Catarrh and Cold Feet.

Out of doors the wind moves at a much greater velocity at head than at foot level; the ground, too, is warmed by the sun. As a rule, then, except during a thaw of snow, the head is cooled out of doors at a greater rate than the feet. Cool breezes blowing 'round the head, the radiant heat of the sun, and a warm ground to stand on are the ideal outdoor conditions. The healthy mucous membrane of the nose under these conditions appears pale and taut. If touched with a probe it does not pit, and there is no thick secretion upon it. Indoors, in those conditions which are unfortunately only too common when the feet are chilled by draught blowing over a cold floor, and the head is immersed in warm stagnant air, the nasal membrane is seen to be swollen, congested, and covered with thick secretion. A probe pushed into the swollen membrane forms a pit. Warming the feet at a fire at once relieves the congestion and removes the obstruction. (This explains the rationale of the mustard bath to the feet as a domestic remedy.) The congestion and swelling of the mucous membrane of the nose and of the air sinuses opening into the nose, largely causes the feelings of headache and stuffiness felt in crowded, overheated places.

In the chamber of the House of Commons the ventilating current is driven up through the floor in such a way as to cool the members' feet, while their heads are exposed to more stagnant air. Cold feet and stuffy heads result.

Cold feet alone do not cause congestion of the nasal membrane, but the condition of cold feet with warm stagnant air 'round the head frequently experienced indoors is a fruitful source of congestion which renders the individual easily liable to infection with the germs of the common cold.

Personal Hygiene.

An American writer remarks, "Person hygiene is very personal." One can only indicate principles, leaving the applications to your own sense of delicacy and decency. The sedentary worker must avoid digestive disturbance and intestinal toxaemia from over-eating and lack of vigorous exercise. His metabolism requires to be stimulated by the cooling power of the open air.

Your close proximity to your clients justifies the demand that your person hygiene shall be so regulated as to avoid the possibility of offence from unpleasant odours associated with perspiration, foul breath from food eaten, from carious teeth, dirty mouths, dirty clothes, soiled with organic discharges, tobacco. It must be remembered that such smells when present are only sensed by one coming to them; the offender is often unaware of them.

It is not often that a patient will have the courage to complain, but I remember one instance in which an elderly lady objected to examination of her face by a medical student whose fingers were deeply stained by and smelt strongly of tobacco. No one enjoyed the incident more than the tutor, who wisely kept his hands in the pockets of his trousers. Though some may not complain, it does not follow that the lack of nice considerations is unobserved, and failure to appreciate this fact may result in the transfer of a client's business to a more careful member of the profession.

I should like to see in every test room an up-to-date lavatory basin with hot and cold water supply. Some may consider this undesirable on aesthetic grounds, but I think most of your clients would be given greater confidence if they could see provision for the hands to be washed before attention to each patient, and that the trial frame is carefully wiped with clean tissue paper or a clean cloth. Dirty cloths and dusters give a stamp of "third class" to any establishment. The risks of conveying infection from one patient to another may be slight, as fortunately I consider them to be. But surely the patient is entitled to the benefit of the doubt. The risks to yourselves may be hardly any greater—most of the infective conditions of the eye should be easily recognisable, and, in any case, no doubt you are not likely to take risks. One might be permitted to mention the possible danger of rubbing the eyes or face or the convey-

ance of infection by the handkerchief, after contact with certain classes of patient.

Equipment in the test room should be chosen with a view to minimising contact with the patient's face, and especially to avoiding unnecessary condensation of the patient's breath. Proper attention to the cleaning of trial frames, brackets, etc., will repay, both from a business and hygienic point of view.

THEORIES OF POSSIBLE CAUSES OF CATARACT AND GLAUCOMA

W. H. Glazer, LL. B., Opt. D.
Philadelphia, Pa.

being

A Lecture delivered to the Philadelphia Academy of Optometry

J. Soelberg Wells, F. R. C. S., surgeon to the Royal London Ophthalmic Hospital, Moorfields, writes, in his Diseases of the Eye, Chapter IX, page 208:

"It must be frankly admitted that the etiology of cataract is still shrouded in much doubt. It appears most probable that the principal causes of the loss of transparency of the lens are to be sought in an impairment of its nutrition, due to some morbid alteration in the vitreous humor, and to inflammatory changes within the lens itself."

So far as I am able to ascertain, Wells' statement that there must be a morbid alteration in the vitreous humor, or that there is an inflammatory change or changes within the lens itself, is unique. The statement is to be discredited, apparently, since laboratory facilities should be sufficiently adequate easily to support or reject it.

"* * * De Wecker thinks that this malnutrition may, perhaps, be owing to a diminution in the blood supply to the anterior portion of the uveal tract, on account of the prolonged spasmodic contraction of the ciliary muscle."

De Wecker's thoughts are worthy of serious reflection, as I shall later attempt to point out, although we can not interpret "spasmodic contraction" as of the intermittent type, since atropine pure would at once curb the spasmodic contraction and effect a cure.

"* * * It is an interesting fact that Iwanoff has often seen oedema of the retina in the eyes of old persons affected with cataract, and it is a question, as he points out, in how far this morbid process in the retina may have been the cause of the cataract, by producing some changes in the vitreous humor."

Later on, I shall attempt to tie up the observations of De Wecker and Iwanoff, for we must respect the observations of these trained scientists.

"* * * There is a form of opacity occurring in the anterior cortex or in the anterior capsule in the immediate equator of the lens which is not progressive, and which is met with very frequently in young persons in chronic ill health, or who are suffering from slow wasting disease."

In any theory as to the cause of cataract, one must seek, for such fundamental cause or causes as will apply to the reasonable explanation of the various types of cataract found in young people as in old.

On the subject of The Light Sense, Chapter VI, page 233, Tscherning, too, points out that cataract and an affection of the fundus of the eye co-exist.

The writer believes that nearly all types of so-called cataract can be considered as having their origin in a highly light-sensitive retinal tissue, due to a pathology, to climatic conditions, to constant exposure to harmful illumination, or to a combination of the foregoing. Of course, the pathology need not be, and probably most often is not, local.

Under certain conditions, nearly everyone has experienced the painful reflexes from exposure to light of high intensity. Those who have been ill can recall that even ordinary light in-

tensity is very irritating. We are all pretty well aware of the quick contraction of the pupils, a narrowing of the palpebral apertures, and a screwing up of the facial muscles under extreme conditions, as when looking up at the sun. Even a short endurance of sunlight is intolerable to retinal tissue. Under these conditions, are we to assume that the light intensity is controlled only by cutting down the pupillary diameter through irritation of the sympathetic and sphincter, or can we reasonably also expect an increase in the blur circles through an act of accommodation, so as to spread the light over a larger area of the retina? The answer must be obvious to any one who has attempted to scope a pair of light-sensitive eyes in the dark room, and who has encountered the spasmodic ciliary action of such a pair of eyes.

In individuals suffering from a pathology, as well as in presbyopes, it is well established that the amplitude of accommodation is comparatively limited. Consequently, if a pair of eyes, resenting a light intensity beyond a certain limit, reduced the brightness by cutting down the pupillary diameter and accommodating, it would seem that a sharp stress would be laid upon inelastic lens substance of the presbyope, or upon lenses already considerably undernourished through sickness. If this stress were lifted, it is reasonable to suppose that the retinal tissue would become aggravated through constant irritation, and an inflammation set up, which might extend along the optic nerve to the brain and endanger life. Consequently, under such circumstances the entire act of vision through the visual processes in much the same manner as one who is compelled to walk after having run a nail into the heel of his foot. Hence, the stress must remain, and must finally resolve itself into a fixed strain. The condition of the crystaline then may be likened to a tensed fist, nourishment being forced away from the lens substance, resulting in death thereof. A cataract, then, may be considered as serving a beneficent purpose—preventing destruction of brain tissue and possibly loss of life itself.

In the case or individuals below the presbyopic age, cataract should be rare and progress slower than in presbyopes, in view of a more elastic lens substance, as well as a tendency to a quicker recovery from the causes producing a hypersensitive retinal tissue, provided, of course, the strained condition has not assumed the nature of a nerveless fatigue and a fixture of the spasm, with attendant atrophy of the ciliary.

Some have argued that uncorrected hypermetropia is one of the principal causes of cataract. Yet, we hear of those whose ametropia had been corrected laying aside their glasses, rejoicing in gaining "second sight."

In passing, it is interesting to note that a British surgeon (Woods) remarked that a great number of troopers in the Indian Army, exposed to the heat and glare of a tropical sun, were especially subject to cataract.

Whatever may be the inducing cause of a sluggish action of the pupils should be considered a contributing factor in hastening the progress of a cataract. The burden of light intensity control by the crystaline would be proportionately increased, and exosmosis from lens to aqueous correspondingly decreased, for it is easily conceivable that an important function of the iris in contracting and dilating is to prevent stagnation of the aqueous fluid. Under such conditions, a much more serious consequence might intervene; for if the cataract development be not rapid, a prolonged irritation of the retinae should invoke every agency for light control. Increased curvature of the lens, through stimulation of the third cranials would be difficult or impossible. We should then expect the remaining agency for subconscious light control to be called into play, namely, an increase in corneal curvature through the action of the extrinsics. But, when the action of the extrinsics is severe, prolonged, a considerable compression must be exerted upon the globe, comparable to any hydraulic force, and all the terrifying symptoms of glaucoma should result as a matter of course.

Even if this state of things did not induce a hypersecretion of the ocular fluids, the matter of drainage through the Spaces of Fontana is not only mechanically interfered with through the advancemnet of the iris body into the aqueous chamber but also through the failure of the iris-pupil to function.

Again quoting J. Soelberg Wells' very valuable work on diseases of the eye, page 403:

"Schnabel calls attention to Brailey's discovery of the atrophy of the ciliary muscle in glaucomatous eyes."

Brailley's discovery, then, would seem clearly to support the theory advanced.

With special reference to acute glaucoma, it is hardly conceivable that an intra-ocular pressure, due to steadily accumulating fluids, would manifest itself so sharply and so quickly. If glaucoma were due to an intra-ocular pressure, it would be more reasonable to suppose that the symptoms would increase in severity gradually, without ensuing intervals of relief.

Charles Stedman Bull, A. M., M. D., has the following to say:

"A second factor which enters into the causation of a posterior staphyloma is an abnormal action of the external muscles of the eyeball. The insufficiency of the internal recti muscles, so often seen in progressive myopia with posterior staphyloma postulates a previous straining of these muscles."

It would be decidedly interesting to know if Doctor Bull's observations went so far as to note whether glaucoma finally ensued in such cases.

Dr. Wells refers to investigations by Knies (pages 402-403) of glaucoma, which led Knies to several conclusions, one of which was stated as follows:

"The relationship between many staphylomatous processes and glaucoma is proved by pathological examinations."

Where atropine is instilled, the prospect of glaucoma, in those cases where extreme retinal sensitiveness exists, is heightened, for light control both through pupils and lenses is greatly diminished, so that the extrinsics are invoked to exert traction upon the cornea, in the subconscious effort to gain relief from light irritation.

The relief from glaucoma, in certain cases, through iridectomy, possibly may be credited to the loss of considerable aqueous fluid, a weakened anterior wall, excision of a considerable portion of secreting cells, a respectable interval of relief from light irritation during the bandaging of the corneal wound, and an interference in the transmission of nerve stimulus to the extrinsic muscles reflexly. It is my conception that while relief from glaucoma may be obtained, danger to the retina, brain and life is heightened unless cataract or other agency intervenes to give relief from light hypersensitivity.

In the treatment of cataract, obviously, it is necessary to neutralize the light irritation, relax the cramped ciliary, and restore the osmotic process whereby the lens gains its nourishment. This assumes, of course, that atrophy of the ciliary muscle has not occurred, and that proper attention is given in overcoming existing bodily ills.

It is primarily important, then, to have vision accomplished by means of the least irritating light. This raises the question as to what light is the most soothing to the eye. Various scientists have advocated abolition of the infra red and ultra violet rays. Some say blue light, or light transmitted by blue lenses is easiest for vision. I think nature points the way, in advocating dark green as the easiest, not only for the sensitive retinal tissues, but for all eyes in general. Its position in the spectrum would argue for its use, for, seemingly, light approaching the violet end would induce an effort to see as in semi-darkness, whereas seeing by light approaching the red end of the spectrum would tend towards seeing under ordinary white light intensity. Whether or not a small portion of the spectrum in and around the red region approaches in perceptible light energy the total energy giving rise to the sensation of white, I do not know; at any rate, instinct (which, perhaps, is unscientific) urges the use of green.

The immediate cause of cataract (retinal light hypersensitiveness) being neutralized, the next thing necessary is to break up the cramped condition of muscle and lens substance. If we liken this condition to a man who has been supporting a weight until he has gone into a state of fatigue, an added small force might cause complete relaxation. Why, then, would it not be applicable to the crystaline? That is, add at frequent intervals, small concave powers, while urging the patient to relax completely. Of

course, if atrophy of the ciliary exists, the attempt would be futile, unless there exists some marvelous means of overcoming an atrophy.

Assuming the cramp relaxed totally or partially, the next thing of importance would be a slow process of absorption and replacement of cataractous tissue. The manner in which the lens receives its nourishment is not clear. Huxley says it receives it from the vitreous. Potter says it probably receives it from the aqueous. I am inclined to think the capsule is a prolongation of the hyaloid membrane, and that the encapsulated lens is an appendage of the vitreous, and receives its nourishment from vitreous channels. Waste products of vitreous and lens are probably discharged into the aqueous, thence to Fontana's Spaces, Schlemm's Canal, etc. I take it this discharge of waste products can not be effected alone through gravity and capillarity; it is probably accelerated by the vigorous contractions and relaxations of the iris pupils. Consequently, metabolism in the lens and capsule can be aided by stimulating the irises gently, or through artificial drainage of the aqueous chamber over a period of time.

ABSTRACT DEPARTMENT

Optometric and ophthalmic Journal articles and reprints to be abstracted should be sent to Dr. G. L. DuPlessis, 209 Yeates Building, Minneapolis, Minnesota. Only papers of interest to optometrists will be reviewed in this department.

Significance of Latent Ocular Muscle Imbalance. Walter H. Fink. American Journal of Ophthalmology. Vol. 10, No. 3, pp. 168-170, 1927.

Fink selected 35 cases who were free from eyestrain, who had only a slight muscle imbalance, whose eyes were practically free from refractive defect and whose acuity of vision was normal. A careful refraction was made in each case and the muscle balance taken. One eye was covered for ten days, and the muscle balance was again taken. 33 of the 35 cases showed evidences of a latent muscular imbalance. The following figures show the changes in muscle balance after the ten day occlusion. The figures indicate prism degrees, that is degrees refracting angle of prism making an equivalent change of direction.

1. **Vertical change at 6 meters.**

Cases.

15 showed from 1 to 2
10 showed from 2 to 3
5 showed from 3 to 4
2 showed ½
1 showed 7
1 showed no change

2. **Vertical change at 33 cm.**

Cases.

12 showed 2 to 3
12 showed 1 to 2
5 showed 3 to 4
2 showed 4
2 showed no change
1 showed 7

3. **Horizontal change at 6 m.**

Cases.

7 showed 1 to 2
7 showed 3 to 4
6 showed 4 to 5
4 showed 2 to 3
3 showed 5 to 6
2 showed no change
2 showed 6 to 7
1 showed 7½
1 showed 8
1 showed 9

4. **Horizontal change at 33 cm.**

Cases.

8 showed between 8 and 9
5 showed 1
4 showed between 2 to 3
3 showed 3 to 4
3 showed 5 to 6
3 showed 6 to 7
3 showed 7 to 8
2 showed 10
2 showed no change
1 showed 15
1 showed 1

C. C. K.

Refraction Under Cyclodamia. Dorland Smith. American Journal of Ophthalmology. Vol. 9, No. 12, pp. 896-903, 1926.

A cyclodamic refraction is a non-cycloplegic refraction. In other words

an optometric refraction. Smith coined the word, finding it necessary it seems, to perform a great number of refractions without using a cycloplegic. The paper deals with the general routine of the cyclodamic refraction and his summary and conclusions are of interest and are as follows:

"1. Exact observation and record, not only with the retinoscope and trial case, but also in the earlier stages of the examination in which the accommodation plays a smaller part.

2. The use of each bit of information as it appears, especially inconsistencies in the record of the different parts of the examination, as a check on general correctness.

3. (a) The use of such methods as will constantly coax the accommodation to relax, without ever allowing it to assist vision until the examination is almost finished. (b) The maintenance of relaxation by encouraging the patient to see and to recognize something, always with both eyes open and always with some overcorrection over both eyes, during the entire skiascopic and most of the trial case examination. (c) The constant watch for the instant of greatest relaxation whenever that occurs, to form a reasonably accurate estimate of what and how much the refractive error really is, as well as what the accommodation makes it seem to be; always remembering that the patient is usually more hyperopic (or less myopic) than he appears to be, and that the limit of possible ciliary relaxation may not yet have been quite reached. (d) Confidence that material relaxation will usually be obtained with sufficient effort, at some time during the examination, though perhaps but for an instant. (e) Appreciation that the numerous methods of repressing the ciliary muscle are less important in themselves than in the thorough way in which they are used. (f) Experience: Accurate refraction under cyclodamia can not be surely attained, unless and until one who can refract well with a cycloplegic has also learned how much control of the accommodation by optical means only he can himself obtain in average types of patients, and has sufficiently checked this by rerefraction under cycloplegia. The number of cases which can then be satisfactorily refracted by the use of cyclodamia instead of cycloplegia should be considerable, though it will naturally vary somewhat with the training and experience of the examiner, with his ability to control the accommodation, and with his alertness to observe the real limit of its variability.

4. The frank use of a cycloplegic in those cases in which relaxation seems unsatisfactory, as for example in spasm of the accommodation, in convergent squint in vigorous children, etc., and in cases where cyclodamia uncovers too little refractive error to explain symptoms of probable accommodative origin. This may sometimes be obviated by reexamining on another day as early in the morning as is practicable, and before the patient has been allowed to do any close work whatever. Some cases, however, will yield only to a cycloplegic, although these, which seem frequent at first, become much rarer with practice.

Conclusions: We can be much more accurate in refracting without a cycloplegic than most of us are: If we cultivate accuracy in each step of the examination; if we use the principles of cyclodamia here outlined, continuously and consistently, and treat the ciliary muscle at all times as a suspect, whose limit of relaxation requires real effort to reach; if we keep a clear mental picture of the probable amount of error as distinct from the apparent amount; if we check our results by inconsistencies in the record; and if we use common sense and judgment as to when and how far to crowd the correction from the apparent towards the probable. Cyclodamia takes more time at first, but with sufficient practice comes to take little more than other methods. When we have sufficient experience to be able to trust cylodamia, we may avoid the annoyance to both patient and examiner of routine cycloplegia; and by getting more knowledge of his accommodative vagaries, and by fitting glasses under the same conditions as those under which he lives and works, we are more apt to make the average patient comfortable.

C. C. K.

The Acid Test For Gold. Practical Notes. The Refractionist (British). Vol. 16, No. 218, p. 174, 1927.

To discriminate between gold and gold-filled material one should slightly file a portion of the material to cut through any plating and then place on the filed area a drop of nitric acid. Should the material be plated the area will at once turn green, and considerable bubbling will take place in the acid covered area. On the other hand no such results will take place on gold material even though it be only 7 ct.

C. C. K.

The Placido Disc. L. A. Swan. The Optician (British). Vol. LXXII, No. 1869, p. 431, 1927.

The utility of the Placido disc in recognising abnormal conditions of the cornea is considerable. The instrument has not received the attention which it merits, due, no doubt, to its utility being confined to the detection of corneal astigmatism and irregularities. As far as the test for astigmatism is concerned, it must be remembered that it is merely a qualitative test and the astigmatism has to be of a fair amount.

The method of using it may be interesting to those practitioners who have not hitherto incorporated the instrument in their practice. The light on the ophthalmic bracket should be placed to the right of the patient and somewhat behind, so as to have the face in shadow. The disc is grasped in the right hand, and the observer must seek the reflection of the rings on the cornea.

The cardboard model has an advantage over the all-metal type in that it is lighter in weight and the white rings are much whiter than those enamelled ones on the metal pattern.

A small foreign body superficially embedded may be overlooked by focal illumination. The Placido disc will enable the refractionist to observe such a case by showing a break in one of the rings, due to a swelling of the corneal epithelium at that part.

A minute corneal nebula can be detected as it causes a break in the reflection of the black and white rings. Evenness of the corneal surface, too, will interfere with the image of the Placido rings, causing some to appear uneven.

In dealing with the detection of keratoconus the instrument is almost indispensable. The effect of the reflected image in this case is that the central rings are close together, whilst the outer rings are more separated. In all cases of high myopic astigmatism, specially in young people, it is advisable to use the Placido in order to rule out the possibility of keratoconus.

Lenticonus is a congenital condition of the crystalline lens. The effect under transmitted light is the same as in the case of keratoconus. The Placido reflection will show at once that the cornea is normal and that the condition must, therefore, be due to lenticonus.

This is important, as keratoconus is a pathological condition, and demands the attention of an ophthalmic surgeon, whereas lenticonus is a congenital condition and no medical treatment is indicated if a reasonable amount of vision can be attained with or without optical treatment.

Irregular astigmatism can be detected by the aid of the Placido disc, which produces a distorted image. It is useful to look for this condition when the media and fundus are normal, but only a slight improvement in vision is obtained by the use of lenses.

The Placido disc should have its place in the equipment of modern optical practitioners. With its aid a definite diagnosis can be made in many doubtful cases, thus preventing the practitioner from recommending the advice and treatment of an ophthalmic surgeon where such a step may be quite unnecessary.

T. O. B.

Headaches of Ocular Origin. W. G. Gillett. American Journal of Ophthalmology. Vol. 10, No. 5, pp. 368-369, 1927.

Gillett claims that forty per cent of all headaches have an ocular factor, and that seventy-five per cent of all bilateral frontal headaches are due to eyestrain.

The term "eyestrain," he says, is a useful one but there are so many different explanations for this condition that few of us have the same ideas regarding it. Some believe that all the pain of eyestrain is due to spasm of

the ciliary muscle. Others feel that fatigue and hyperesthesia of the retina are among the salient factors, while still others believe that muscular imbalance is more important than anything else. According to Lancaster it is the adjusting mechanism of the eye that is strained and this adjusting mechanism is composed of two parts: first, the focusing mechanism, which secures a clear image on the retina, and second, the fixation mechanism which fixes the eye on the object to be looked at. He also points out that eyestrain is more than the fatigue or strain of this mechanism, for it has been shown that the extrinsic muscles are capable of pulling one hundred times the load ever required in ordinary eye movements and we know that there are thousands of people with hyperopia of quite large degrees, who are absolutely comfortable without correcting glasses. This other factor which enters into eyestrain is the fatigue of the elaborate and intricate system for coordinating these muscles, i. e., fatigue of their motor nerve cells and centers.

If we agree that fatigue or strain of one or all of the above mechanisms can produce headaches then under what conditions do these headaches become manifest? They most commonly become manifest when normal mechanism has some handicap such as a refractive error to contend with. The refraction in one eye may be different from the other. The patient may be recovering from sickness, operation or general debilitating condition, in which all the muscles of the body are weakened.

Undue strain may be placed on the mechanism because of poor light, small print or an unsteady object to be focused. The media of the eye may be clouded or the retina diseased thus throwing a more constant effort on the focusing mechanism in an effort to secure a clearer picture. These are only a few of the many exciting causes which might be mentioned.

Most ocular headaches are frontal and bilateral, they follow long continued use of the eyes in a poorly lighted room, etc., but eye headaches have been described as low down as the twelfth dorsal vertebra and in every conceivable place on the head. Many other conditions have produced headaches in exactly the same places. Some authors would be very specific about eye headaches and give them a definite order of frequency such as (1) supraorbital (2) deep orbital, (3) frontooccipital, (4) temporal. Kearney would even go so far as to classify the refractive error by the position of the headache, a frontal or supraorbital headache indicates a hyperopic error, an occipital headache an imbalance of the extrinsic muscles and temporal headache an astigmatic error. A headache occurring in the frontal and temporal region would therefore suggest a compound hyperopic astigmatism, etc.

Ocular headaches, Gillett claims, are not often encountered early in the morning though there is one form which is supposed to be due to sudden spasm of the ciliary muscle on first opening the eyes. This is seen in people who have used their eyes far in excess of normal on the preceding day. Myopic patients, of course, have very few headaches which are directly attributed to their eyes.

The headaches of glaucoma are important because they are often in the occipital region and so insidious that the patient does not associate them in any way with his eyes.

T. O. B.

BOOK NOTES

THE "WHY" OF BLUE LENSES IN CATARACT CASES

Withers Bagwell, Opt. D.

Published by the Rey Publishing Co., South Boston, Virginia. Paper covers, 32 pages, 8 graphs. $1.50. 1927.

Withers Bagwell in this monograph discusses the advisability of prescribing tinted lenses for cases of lenticular opacities, which he claims are usually caused by the infra red rays rather than by the ultra violet. Working upon this hypothesis he suggests the use of green rather than blue lenses to arrest the development of the opacities.

This small volume is rather well written and interesting but the chapter headings are terrible, being irrelevant, their flippant style showing very poor taste in a technical manuscript.

C. C. K.

THE AMERICAN JOURNAL OF OPTOMETRY

Vol. 4 JULY, 1927 No. 7

CAREL C. KOCH, EDITOR
209 Yeates Building, Minneapolis, Minn.

J. I. Kurtz, Associate Editor
209 Yeates Building, Minneapolis, Minn.

E. O. Fjelstad, Associate Editor
22 E. 38th St., New York, N. Y.

Published monthly as the organ of the Delaware, Iowa, Maryland, Minnesota, Nebraska, North Dakota, Oklahoma and Vermont Optometric Associations.

Original papers, scientific communications and correspondence should be addressed to the Editor. Books for review should be sent to Dr. E. O. Fjelstad. Clinical Reports and Society Proceedings should be sent to Dr. J. I. Kurtz. Practical Notes and Current Refractive Topics should be addressed to Dr. R. M. Peckham, Waterbury, Conn.

Annual Subscription Two Dollars in Advance. Single Copies 20c.

Copy of advertisements must be sent to Dr. Jack I. Kurtz by the tenth of the month preceding their appearance. Subscriptions, applications for single copies, communications with reference to advertising or other business, should be addressed to the Business Manager.

DR. JACK I. KURTZ, Room 209 Yeates Building, Minneapolis, Minnesota.

The Journal has no objection to the reprinting by other magazines of any of its articles, provided such reprints are properly credited to the American Journal of Optometry.

"PERFECT SIGHT WITHOUT GLASSES"

At the present time advertisements are appearing in certain publications having national distribution advising the public in general to discard their glasses, a thing possible, the advertiser claims, by buying his course of lessons and the apparatus which goes with them, which he has for sale and following the directions with care. Much is of course claimed by the advertiser for his type of technic.

At the same time that the above is going on, two men, and perhaps more, but we know positively of two, are traveling about the country putting on lectures in various centers, stressing the same claims and making the same sensational appeal to the public to "Throw Away Your Glasses." These men, usually claiming to be great specialists, also have something to sell, and being high-pressure salesmen proceed to put over their proposition in a first class financial way as far as they are concerned, wherever presented. Being itinerant salesmen with, we believe, little intention of revisiting any of these cities in an official capacity at least, they make any promises regarding their courses of home eye treatments necessary to sell the course.

And, too, a large eastern publishing house has come out with a book of instructions on the same system and this book is being pushed somewhat strongly by an anti-medical "so-called" health journal which largely gets its readers among those of the American public who still cling to the idea of carrying about a horse-chestnut to ward off rheumatism.

A mail order course of home instruction in caring for the defects of the eye. A similar course of instruction on ocular exercise from a smooth talking salesman. An elaborate book, going into some detail as to the proper procedure to follow in discarding the optical appliances called glasses, but the end is not yet. Not only is the public being milked by these schemes, but even professional men seem to be fair prospects, for we understand a small semi-professional school in the central west now seems to be giving instruction, either by mail or to resident students (these students being osteopaths, optometrists, physicians or chiropractors who can be persuaded to enroll), teaching these men, so they claim, just how to correct the visual ills of the nation without having to resort to glasses.

Now what is this all about? Has someone developed a technic whereby

one can eliminate or in some manner cure myopia, or hyperopia, or astigmatism? Unfortunately not! Nor are those interested in the sales promotion schemes just mentioned doing much research work on the subject. As we view the matter, theirs is chiefly a piece of sales endeavor, to be strongly pushed today and discarded tomorrow as soon as the sucker list has been well worked.

All of these schemes are based as far as we can find out on the exploded theories of one, Bates by name, who could never prove to his own or anyone else's satisfaction that his theory of accommodation as he first propounded it was sound. His theories, and it is on this theory that the book, and these various courses are in general founded, is in brief, that the act of accommodation is governed by the extrinsic muscles of the eye acting upon the globe of the eye, lengthening or shortening the eye as needed, thus refocusing the eye without any change necessarily taking place in the surface curvatures of the crystalline lens. This theory can be refuted in so many ways that it is needless here to go into them.

However, it is true that there are patients today having a more or less perfect orthophoria and using O. U. plus 0.25 D. cylinder axis 90 who could easily be talked into discarding their optical appliances and who would no doubt never miss them were they discarded under certain mental stimulus, but no treatment of the character under discussion, no matter how religiously employed, would alter in the slightest degree the refractive status of these eyes.

Schemes of this character have always been with us and probably always will be. It is to be regretted that the public can be preyed upon in this way by these men, but it is still more to be regretted that those working on optometric research have been unable to, by the use of some therapeutic measure of a legitimate character, correct myopia, hyperopia and astigmatism without the use of a lens. Perhaps the time will come when this can be done, and as optometrists we look forward to this day when patients can by means of a few treatments be relieved of their visual defects.

C. C. K.

In Memorium

JOHN C. EBERHARDT, OPT. D.

Dr. John C. Eberhardt passed away on June 12th at Dayton, Ohio, after a long and protracted illness, which ended the career of one of the country's most active workers for professional optometry. Dr. Eberhardt was a keen student and writer. He was one of the first lecturers in applied optometry at the Ohio State University. He was also active for many years in state and national association work and served on many important committees. He was president of the Ohio State Board of Examiners in Optometry and at one time served as president of the American Optometric Association. His interests were always on the educational and professional side of optometry and he was ever a leader in the right.

J. I. K.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

STATE EDITORS

E. B. ALEXANDER, Oklahoma
A. S. ANDERSON, North Dakota
J. F. ANDREAE, Maryland
L. P. FOLSOM, Vermont
D. A. KINNEY, Iowa
J. A. LARGE, Minnesota
C. A. PERRIGO, Nebraska
M. B. MEYER, Delaware

Reports of Society Proceedings in Delaware should be sent to Dr. M. Burton Meyer, 101 West Eighth St., Wilmington; in Iowa to Dr. D. A. Kinney, Charles City; in Maryland to Dr. J. F. Andreae, Baltimore; in Minnesota to Dr. J. A. Large, Winona; in Nebraska to Dr. C. A. Perrigo, Freemont; in North Dakota to Dr. A. S. Anderson, Williston; in Oklahoma to Dr. E. B. Alexander, Duncan, and in Vermont to Dr. L. P. Folsom, So. Royalton.

MINNESOTA BOARD

The following candidates were successful at the recent State Board examination held in the Old State Capitol building, St. Paul.

Drs. Thomas I. Bohan, Mankato, Minn.; Trygve Hansen, 4224 Cedar Ave., Minneapolis; Donald E. Hein, 4864 Magnolia St., Chicago, Ill.; Harold Geo. Johantgen, 1806 Penn Ave. N., Minneapolis; Anton Lang, Clear Lake, Minn.; E. R. Best, St. Louis Park, 5318 Minnetonka Blvd.

W. H. Nordin, Opt. D.,
Asst. Secy.

THE MID-SUMMER SHORT COURSE AT MINNESOTA

The Mid-Summer Short Course in Optometry given by the Minnesota State Association of Optometrists at the University of Minnesota was attended by 43 optometrists. The course lasted five days and classes were held mornings, afternoons and evenings. The speakers were: Dr. Charles Sheard of the Mayo Clinic at Rochester, Minnesota; Dr. E. P. Lyon, Dean of the Medical School of the University of Minnesota; Dr. Joseph Valasek, of the Department of Optics; Dr. A. T. Rasmussen of the Department of Anatomy, and Dr. A. G. Bills of the Psychology Department, all of the same university Four optometrists gave clinical lectures, they being, Dr. Earl Jones of St. Paul, and Drs. L. L. DeMars, J. I. Kurtz and C. C. Koch, all of Minneapolis. The complete program follows:

Monday, June 13th, 1927.

9:00 A. M. to 10:30 A. M., at the Physics building, U. of M.

"The Theory and Measurement of Light and Color." Part one. By Doctor Joseph Valasek. This lecture with its accompanying laboratory demonstrations and experiments dealt with the theories of light.

10:30 A. M. to 11:50 A. M., at the Physics building, U. of M.

"Psychology of Vision." Part one. By Doctor A. G. Bills. The lecture dealt with the interpretation of visual images.

3:00 P. M. to 5:00 P. M., at 513 Wilmac building, Minneapolis.

"Tonicity and Duction Tests at the Near and Far Point." By Doctor L. L. DeMars. A clinical demonstration. In this period routine tests as well as those necessary for the amblyopic and squint cases were reviewed.

8:00 P. M. to 10:00 P. M., at the Physics building, U. of M.

"Practical Points in Routine Ocular Refraction." Part one. By Doctor Charles Sheard. A lecture on refinements in subjective testing.

Tuesday, June 14th, 1927.

9:00 A. M. to 10:30 A. M., at the Physics building, U. of M.

"The Theory and Measurement of Light and Color." Part two. By Doctor Joseph Valasek. This lecture and demonstration dealt with spectro-photometry. The measurement of intensity and velocity of light.

10:30 A. M. to 11:50 A. M., at the Physics building, U. of M.

"Psychology of Vision." Part two. By Doctor A. G. Bills. The lecture dealt with the physical interpretations of sight as continued from lecture one.

3:00 P. M. to 5:00 P. M., at 209 Yeates building, Minneapolis.

"The Hazen Kratometer and Its Use." By Doctor J. I. Kurtz. A clinical demonstration and a review of the therapeutic values of oculo-prism treatment.

8:00 P. M. to 10:00 P. M., at the Physics building, U. of M.

"Practical Points in Routine Ocular Refraction." Part two. By Doctor Charles Sheard. This lecture dealt with points on Skiascopy—both dynamic and static.

Wednesday, June 15th, 1927.

9:00 A. M. to 10:30 A. M., at the Physics building, U. of M.

"Neurology of Vision." By Doctor A. T. Rasmussen. Tracing the nerve pathways the visual sensations travel over until they reach the brain centers.

10:30 A. M. to 11:50 A. M., at the Physics building, U. of M.

"Practical Points in Routine Ocular Refraction." Part three. By Doctor Charles Sheard. In this lecture Doctor Sheard dealt with ocular myology, and he here reviewed the newer phases of diagnosis and treatment for muscular defects.

Thursday, June 16th, 1927.

9:00 A. M. to 10:30 A. M., at the Physics building, U. of M.

"The Theory and Measurement of Light and Color." Part three. By Doctor Joseph Valasek. This lecture and demonstration dealt with the theories of color vision.

10:30 A. M. to 11:50 A. M., at the Physics building, U. of M.

"The Physiology of the Iris." By Doctor E. P. Lyon. In this lecture Dean Lyon reviewed in detail the working of the iris, its purpose and its relationship with the other organs of sight.

3:00 P. M. to 5:00 P. M., at 504 Midland Trust building, St. Paul.

"The Myoculator and Its Use." By Doctor Earl E. Jones. A clinical demonstration of this new version exercising device, with reports of cases.

8:00 P. M. to 10:00 P. M., at the Physics building, U. of M.

"Practical Points in Routine Ocular Refraction." Part four. By Doctor Charles Sheard. This lecture dealt with fusion reserves and their significance. Special clinical cases were also reviewed.

Friday, June 17th, 1927.

9:00 A. M. to 10:30 A. M., at the Physics building, U. of M.

"The Theory and Measurement of Light and Color." Part four. By Doctor Joseph Valasek. This lecture and laboratory demonstration dealt with color analysis and the use of colored or tinted lenses.

10:30 A. M. to 11:50 A. M., at the Physics building, U. of M.

"The Physiology of the Retina." By Doctor E. P. Lyon. A lecture on retinal functions.

3:00 P. M. to 5:00 P. M., at 209 Yeates building, Minneapolis.

"Charting the Visual Field." By Doctor Carel C. Koch. A clinical demonstration in the use of the perimeter and stereo-campimeter.

8:00 P. M. to 10:00 P. M., at the Physics building, U. of M.

"Practical Points in Routine Ocular Refraction." Part Five. By Doctor Charles Sheard. His last lecture of the course dealt with the physiological effects of light, with especial reference to the needs of the eye.

A. O. A. MEETS IN WASHINGTON

The American Optometric Association met in Washington, D. C., during the past month. The attendance was small and the educational sessions were poorly attended, the men present preferring to spend their time as a fellow editor puts it, in "matters political." The chief activity of the year was the adoption of a new constitution. The officers elected to serve for the coming year are: Drs. Leo Mayer of New York, president, H. R. Spitler of Ohio, first vice-president, W. M. McKinley of California, second vice-president, E. Kiekenapp of Minnesota, secretary, and C. M. Jenkins of Indiana, treasurer. Drs. Howe, Martin and Kimball were elected trustees. The next meeting of the association will be held in Grand Rapids, Michigan, June, 1928.

NOTICE TO SUBSCRIBERS

Notify us when you change your address

AMERICAN JOURNAL OF OPTOMETRY

Yeates Building

Minneapolis, Minnesota.

FOR SALE—A TEN THOUSAND DOLLAR OPTICAL BUSINESS, old established concern. We invite investigation. Would rather sell only half interest. Will consider sale of entire business if desired. I want to get out in the open. This business is of twenty-eight years standing. Anyone who is qualified and interested to give it his attention can enter the BEST OPTICAL BUSINESS IN OKLAHOMA. Latest modern equipment throughout. I just wish to retire. This is my only reason for selling. My health is fine. $8,000 will handle entire business. I know of nothing that will bring such large returns on a similar amount invested. Write A. D. Coon, Ada, Oklahoma.

OPTOMETRISTS

MEMBERS OF THE ASSOCIATION.
PUBLISHERS OF THE JOURNAL

PATRONIZE YOUR ADVERTISERS

WHO ARE HELPING TO MAINTAIN THIS JOURNAL
(YOUR PUBLICATION)
WITH THEIR ADVERTISING.